AMENDMENTS TO THE SPECIFICATION

In accordance with 37 C.F.R. §1.121(b), please amend the specification of the application as indicated in marked-up form below, where additions are underlined, deletions are struck through or boxed, and new paragraphs are presented without markings.

<u>Paragraph beginning on line 22 of page 9</u>

FIG. 2 is a block diagram of a distance extender 200, according to an embodiment of the invention, shown as part of an electronic system 201 arranged in a first configuration. As illustrated in FIG. 2, distance extender 200 comprises a subsystem 210, a subsystem 220, and an electrical cable 230 electrically coupled between subsystems 210 and 220. As an example, subsystem 210, subsystem 220, and electrical cable 230 can be similar to subsystem 110, subsystem 120, and electrical cable 130 respectively, each of which were first shown in FIG. 1. <u>Electrical cable 230 can comprises a plurality of wires, including a first wire, extending between end 231 and end 232.</u> Distance extender 200 further comprises a switch 240 electrically coupled between device 150 and device 145 as well as a device 245. As an example, device 245 can be similar to device 145, first shown in FIG. 1. Additional devices, all of which can also be similar to device 145, can also form a part of electronic system 201, and can also be electrically coupled to switch 240, depending on the configuration and capacity of switch 240. As an example, switch 240 can be a KVM Switch. As another example, distance extender 200 can function in a manner similar to the function of distance extender 100 (FIG. 1).

<u>Paragraph beginning on line 3 of page 12</u>

FIG. 4 is a block diagram of distance extender 200 shown as part of electronic system 201 arranged in a third configuration. FIG. 4 illustrates another one of the possible additional

configurations mentioned above, in which distance extenders according to embodiments of the invention are used to increase both a distance separating device 145 from switch 240 and a distance separating device 150 from switch 240. As illustrated in FIG. 4, distance extender 200 is used to extend a distance separating device 150 from switch 240, such that subsystem 210 is electrically coupled to switch 240, and subsystem 220 is electrically coupled to device 150. A distance extender 400 is used to extend a distance separating device 145 from switch 240. <u>Electrical cable 430 can comprises a plurality of wires, including a first wire, extending between end 431 and end 432.</u> Distance extender 400 comprises a subsystem 410, a subsystem 420, and an electrical cable 430. As an example, subsystem 410, subsystem 420, and electrical cable 430 can be similar to subsystem 110, subsystem 120, and electrical cable 130, respectively, each of which were first shown in FIG. 1. Subsystem 410 is electrically coupled to device 145, and subsystem 420 is electrically coupled to switch 240.

<u>Paragraph beginning on line 14 of page 13</u>

Power for the circuitry of subsystem 110 is taken from the +5V supply pins on the PS/2 ports of the computer. Electrical power signals enter subsystem 110 through input header 560 and are passed to voltage boost circuit 510 and to a local power supply 515. Local power supply 515 supplies five volts or another voltage to the circuitry of subsystem 110. Voltage boost circuit 510 boosts the incoming voltage from 5V to a higher voltage in order to overcome and/or compensate for losses, such as IR losses, in electrical cable 130 (FIGs. 1[[-4]]) during the transmission of the electrical power signal across electrical cable 130. As an example, voltage boost circuit 510 can boost the incoming voltage to 30V. The electrical power signal, with

boosted voltage, is passed to ~~modulation/demodulation circuit 520~~ filter circuit 530, where it will be combined with the coded data signal as described below.

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As illustrated in FIG. 5, input header 560 also receives video signals, comprising red, green, and blue video signals, and synchronization signals (sync signals) in addition to receiving data, clock, and electrical power signals. The sync signals are mixed, or multiplexed, into the video signals, and the resulting combined signals (comprising video signals and sync signals) are amplified by a video amplifier 550, passed into end 131 of electrical cable 130 (FIGs. 1[[-4]]) and transmitted differentially along electrical cable 130. In one embodiment, the sync signals are mixed into the red and blue video signals only, amplified, and differentially transmitted. In the same or another embodiment, connector 131 is an RJ45 connector. Pre-emphasis circuit 551, in at least one embodiment, forms a part of video amplifier 550. Pre-emphasis circuit 551 pre-emphasizes, or increases, the high-frequency portion of the video signals before the video signals are transmitted across electrical cable 130 because higher frequency video signals are attenuated during such transmission to a greater extent than are lower frequency signals. Pre-emphasizing the high-frequency portion of the video signals in this way makes it easier to recover those signals after they have arrived at subsystem 120 (FIG. 1).

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After passing through microprocessor 565 and UART 567, the data signal is passed ~~through a data modem 570 and then~~ to modulation/demodulation circuit 520 where it is modulated. ~~and~~ The data signal is then coupled onto the boosted voltage at filter circuit 530. The

combined signal, comprising: (1) the power signal with the boosted electrical voltage signal; and (2) the data signal, is then sent to filter circuit 530 and then to end 131 of electrical cable 130 (FIGs. 1[[-4]]) before being sent across electrical cable 130. Filter circuit 530 prevents the data signal from interfering with power supply 515, as will be discussed in more detail below.

<u>Paragraph beginning on line 19 of page 16</u>

As discussed earlier in connection with FIG. 5, the data signal is routed from input header 560 to microprocessor 565, where the data signal is multiplexed and coded prior to being sent to modulation/demodulation circuit 520. The coded data signal is then transmitted by data UART 567 ~~through data modem 570~~ to modulation/demodulation circuit 520. As illustrated in FIG. 7, the data signal enters modulation/demodulation circuit 520 on a line 701, and is labeled "data_from_controller." The data line is a single-ended square wave 0 to 5V signal. A logic "1" is indicated by a 5 volt direct current (DC) level and a logic "0" is indicated by a 0 volt DC level. This signal is inverted and applied to pin 3 of a transceiver 710, which in the illustrated embodiment is an RS485 transceiver. Pin 3 of transceiver 710 is an enable pin. A one megahertz (MHz) signal is applied to the data input of transceiver 710. Whenever pin 3 of transceiver 710 is high the one MHz signal is passed through transceiver 710 to the differential outputs present on pin 6 and pin 7 of transceiver 710. The resultant waveform on pin 6 of transceiver 710 is an amplitude-modulated signal of the type shown in FIG. 8. Since the output of transceiver 710 is a differential signal, the same signal is present on pin 7 of transceiver 710, except that the signal on pin 7 of transceiver 710 is 180 degrees out of phase with the signal on pin 6 of transceiver 710.

Paragraph beginning on line 11 of page 17

A 110 ohm resistor, R35, loads the differential signals present at pins 6 and 7 of transceiver 710. ~~Resisters~~ Resistors R32, R33, R37, and R38 bias pins 6 and 7 of transceiver 710 so that the steady state level of pin 1 of transceiver 710 is a logical "0." The signals present at pins 6 and 7 of transceiver 710 are AC coupled through capacitors C33 and C35 to connector pins 7and 8 of end 131, which is illustrated as an RJ45 connector in FIG. 7. Resistors R51 and R54 and capacitors C33 and C35 are used to match the differential signal to the impedance of electrical cable 130 (FIGs. 1-4) and to the receiver input impedance.

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FIG. 9, in graph 900, illustrates a modulated data signal of the type produced by modulation/demodulation circuit 520 riding on an electrical power signal having a boosted voltage produced by voltage boost circuit 510 (FIG. 5). Graph 900 comprises a channel 910 and a channel 920. Channel 910 represents data input on line 701 (FIG. 7) of modulation/demodulation circuit 520 (FIGs. 5 and 7). Channel 920 represents modulated data riding on an electrical power signal having a boosted voltage of 30 volts. As described above, the modulated data signal and the boosted electrical voltage signal are simultaneously carried on a single wire pair in electrical cable 130 (FIGs. 1[[-4]]). As an example, pins 7 and 8 of end 131, shown in FIG. 7, correspond to the two wires of the single wire pair on which the combined signal is carried. In a CAT 5 cable, the two wires form a twisted wire pair, as mentioned above.

<u>Paragraph beginning on line 19 of page 18</u>

FIG. 11 is a circuit diagram illustrating a portion of modulation/demodulation circuit 520 and a filter circuit 530 according to an embodiment of the invention. Filter circuit 530 prevents the one MHz signal (first discussed in connection with FIG. 7) from interfering with power supply 515 and the circuitry of subsystem 110. As illustrated in FIG. 11, the data signal is coupled onto the connector pins 7 and 8 of end 131 through capacitors C33 and C35. The data signal is blocked from the power of power supply 515 and from the ground signals by inductors L4, L2, L3, and L1, and by a capacitor C46. In the embodiment illustrated in FIG. 11, the modulated data signal is riding on the boosted voltage power line, and on the ground line, but is prevented from back-feeding into power supply 515 by filter circuit 530. As discussed above, filter circuit 630 (FIG. 6) of subsystem 120 is the same or substantially similar to filter circuit 530. Accordingly, the data signal can be transmitted bi-directionally down a single twisted pair of a CAT5 cable or other electrical cable 130 (FIGs. 1[[-4]]) and the DC voltage can be delivered to subsystem 120 on the same twisted pair without interfering with the circuitry of subsystem 110 or subsystem 120.

<u>Paragraph beginning on line 6 of page 20</u>

FIG. 13 is a circuit diagram illustrating pre-emphasis circuit 551, which is designed to emphasize the high frequency component of the video signals, before such signals are transmitted, in anticipation of the high frequency attenuation that occurs over long lengths of electrical cable 130 (FIGs. 1[[-4]]). As illustrated in FIG. 13, capacitors C51 and C52 and resistors R69 and R70 are switched into the feedback ~~leg~~ <u>legs</u> of a differential driver U6 by a transistor Q6 <u>and Q7, respectively</u>. Capacitors C51 and C52 and resistors R69 and R70 give a

low impedance feedback path for high frequencies, thus peaking the gain of the high frequency components in the amplifier. A switch on subsystem 120 ultimately controls transistor Q6. The switch is read by microprocessor 665 of subsystem 120, and the status of the switch is transmitted back to subsystem 110 over wire pair carrying the combined data and power signal. Capacitors C17 and C27 and resistors R63 and R64 are also used to adjust the amplifier frequency response.

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FIG. 14 is a circuit diagram illustrating attenuation/compensation circuit 651. As was first discussed above in connection with FIG. 6, subsystem 120 accepts the differential video signals from subsystem 110, amplifies the video signals, and outputs a [[signal-ended]] single-ended video signal to connector 680 (FIG. [[4]] 6). As the length of electrical cable 130 (FIGs. 1[[-4]]) increases, the higher frequency components of the video signals are increasingly more attenuated during their transmission along electrical cable 130, as discussed above. To compensate for the loss of amplitude, a series resistor and capacitor are placed in parallel with a gain resistor R20 of the differential-to-signal-ended amplifier that ~~form~~ forms a part of video amplifier 650 (FIG. 6). In this way, various compensation legs can be switched into the feedback path. A resistor R61 and a capacitor C48, a resistor R60 and a capacitor C47, and a resistor R59 and a capacitor C46 respectively form the three resistor-capacitor (RC) pairs.